A case of diprosopiasis in Trachemys scripta scripta

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Summary
This short communication describes a case of diprosopiasis in Trachemys scripta scripta imported from Florida (USA) and farmed for about 4 months by a private owner in Palermo, Sicily, Italy. The water turtle showed the morphological and radiological features characterizing such deformity. This communication aims to advance the knowledge of the reptile's congenital anomalies and suggests the need for more detailed investigations to better understand its pathogenesis.

Su di un caso di diprosopia in Trachemys scripta scripta

Nel presente lavoro gli Autori riportano un caso di diprosopia in Trachemys scripta scripta importata dalla Florida (USA) e allevata per circa 4 mesi da un privato di Palermo, Sicilia, Italia. All'esame ispettivo e radiologico si evidenziavano caratteristiche deformità morfologiche e scheletriche. Tale comunicazione ha lo scopo di promuovere la conoscenza delle anomalie congenite dei rettili, suggerendo la necessità di indagini più approfondite per capire meglio la patogenesi.

Several congenital malformations affecting different human and animal species are widely described in the literature; they are the abnormalities of structure and function that are recognizable before birth (prenatally), at birth, or years later (Dennis and Leipold 1979). They may affect a single anatomic structure or function, an entire system, or part of several systems.

The majority of human and animal malformations are due to a multifactorial aetiology (Arthur 1980). Genetic and environmental factors, or their interaction, are the most common causes (Dennis and Leipold 1979). Several teratogens, such as viruses, chemicals, poisonous plants, and nutritional deficiencies are often responsible of endemic malformations in large animals (Coppock and Dziwenka 2011).

Conjoined twins and embryonic duplication – defined as a progressive series of malformations, ranging from a partial duplication of a part of the body to the almost total formation of 2 individuals – is a subject of interest because it represents a rare event in veterinary practice and is often caused by pathogenetic discrepancies (Lanteri et al. 2013, Mazzullo et al. 2009).


Conjoined twin embryos in sea turtles usually die before pipping (Miller 1985) in the early stages of development (Kaska and Downie 1999), and their occurrence has been revealed by the post-hoc examination of nest contents. Nevertheless, a conjoined pair of green turtles that lived in captivity for some months has already been reported in the literature (Haft 1994).

Diprosopiasis is characterized by an alteration
of the cranial portion of embryo, resulting in a more or less severe and wide duplication of the face. It is an extremely rare malformation in both humans and domestic animals (Costa et al. 2014). Diprosopias represents the most severe form of facial malformation and, at the same time, the most simple of Teratology framework of parallel double monsters (Pelagalli 1982). However, a few cases of diprosopias have been reported in sheep (Kerr 2007, Kaçar et al. 2008, Fisher et al. 1986, Mazzullo et al. 2003), goats (Mukaratirwa et al. 2006), cattle (Schulze et al. 2006, Hishinuma et al. 1987), cats (Aharon et al. 1991), and chicken (Saini et al. 1993).

The pathogenesis of diprosopiasis depends on a bifurcation of the cranial portion of the notochord, which causes duplication of the anterior part of the neural tube, resulting in the formation of 2 forebrains (Pelagalli and Castaldo 1998, Hemachandran et al. 2004).

This short communication describes the clinical, pathologic, and radiographic findings of a case of diprosopiasis in a water turtle. A 6 months-old water turtle (Trachemys scripta scripta), imported from Florida (USA) and reared for about 4 months by a private owner in Palermo (Sicily, Italy), was brought to the Department of Veterinary Science, University of Messina (Sicily, Italy). The egg was incubated at temperature of 29 °C (84°F) for 80-90 days with a bedding of about 2 inches of vermiculite.

The subject was kept in a suitable terrarium heated to 28°C, with natural light (sunlight), fed with mosquito larvae, and a minimum vitamin supplementation. The owner reported the failure of a normal growth of the animal and food intake, probably due to a faulty sensory perception of sight, while maintaining the normal bilateral movements of the head.

Total body radiographic examination, performed in dorso-ventral projection without using anti-diffusion grid because of the small size of the animal, revealed the fusion at the level of the iugal (zigomatic) and post-frontal regions of the 2 crania in a single head joined to a single rachis. The latter appeared deformed at the level of the first vertebra. The cranium was assessed via dorsoventral projection using high definition film. The assessment showed the presence of a single large cranial vault without division septa (Figure 1). The presence of thin radio-transparent areas referable to eye cavities in the cranial and lateral portions, and the projection of a single trachea in the median region were also detected.

After spontaneous death, autopsy showed signs of delayed growth (Figure 2). The plastron was irregularly concave and carapace showed deformation on the right margin. Externally, the turtle showed a wide cranium, constituted of the fusion of both the 2 heads, with 4 ocular cavities: the medial ones (white arrows in Figure 2), normally sized for the species and filled with each eye globe, and the lateral ones (yellow arrows in Figure 2), filled with necrotic material. Two nasal regions (red arrows in Figure 2), each with its own mouth opening, were also present. Oral vestibules (blue arrows in Figure 2) were incomplete, although each contained its own tongue.

The left mouth cavity showed the presence of a small sized oral-pharyngeal canal as compared to the normally conformed right one.

On the ventral surface, jaws as well as medial and lateral maxillae of both the heads, were entirely developed, and provided of a normal temporo-mandibular joint.

On the basis of gross and radiological findings, the case here reported was classified as “Diprosopus”, following the Duhamel’s classification (Duhamel1966).
Although diprosopiasis in turtles is a very known condition, the literature on this topic is extremely scarce, particularly in marine ones (Pezzullo 2000, WWF 2005). Also for this species, this anomaly is often considered as a particular form of incomplete twins (Ewert 1985), in which industrial and agricultural contaminants may play an important role (WWF 2005).

Anyway, considering the singularity of the case reported here, a possible aetio-pathogenesis is hard to be determined.

Most of animal malformations, especially in some species, are strictly linked to environmental pollutions and their knowledge to be used as important bio-indicators for the terrestrial pollutants.

References


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